

311-CD-101-001

## **EOSDIS Core System Project**

# **Data Distribution Database Design and Schema Specifications for the ECS Project**

Draft

**This document has not yet been approved by the  
Government for general use or distribution.**

January 1998

Raytheon Systems Company  
Upper Marlboro, Maryland

# Data Distribution Database Design and Schema Specifications for the ECS Project

Draft

January 1998

Prepared Under Contract NAS5-60000  
CDRL Item #050

## RESPONSIBLE ENGINEER

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Raytheon Systems Company  
Upper Marlboro, Maryland

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# Preface

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This document describes the data design and database specification for the subsystem. It is one of ten documents comprising the detailed database design specifications for each of the ECS subsystems.

The subsystem database design specifications for the as delivered system include:

|            |  |
|------------|--|
| 311-CD-100 | Access Control (ACL) Subsystem Database Design and Database Schema Specifications for the ECS Project                |
| 311-CD-101 | Data Distribution (DDIST) Subsystem Database Design and Database Schema Specifications for the ECS Project           |
| 311-CD-102 | Data Management (DM) Subsystem Database Design and Database Schema Specifications for the ECS Project                |
| 311-CD-103 | Ingest Subsystem Database Design and Database Schema Specifications for the ECS Project                              |
| 311-CD-104 | Interoperability Subsystem (IOS) Database Design and Database Schema Specifications for the ECS Project              |
| 311-CD-105 | Management Support Subsystem (MSS) Database Design and Database Schema Specifications for the ECS Project            |
| 311-CD-106 | Planning and Data Processing Subsystem (PDPS) Database Design and Database Schema Specifications for the ECS Project |
| 311-CD-107 | Science Data Server (SDSRV) Subsystem Database Design and Database Schema Specifications for the ECS Project         |
| 311-CD-108 | Storage Management (STMGMT) Subsystem Database Design and Database Schema Specifications for the ECS Project         |
| 311-CD-109 | Subscription Server (SUBSRV) Subsystem Database Design and Database Schema Specifications for the ECS Project        |

This submittal meets the milestone specified in the Contract Data Requirements List (CDRL) of NASA Contract NAS5-60000. It is a formal contract deliverable with an approval code 1. It requires Government review and approval prior to acceptance and use. This document is under ECS contractor configuration control. Once approved, contractor approved changes will be handled in accordance with Class I and lass II change control requirements described in the EOS Configuration Management Plan, and changes to this document shall be made by Document Change Notice (DCN) or by complete revision.

Entity Relationship Diagrams (ERDs) presented in this document have been exported directly from tools and some cases contain too much detail to be easily readable within hard copy page constraints. The reader is encouraged to view these drawings on-line using the Portable Document Format (PDF) electronic copy available via the ECS Data Handling System (ECS) on the world-wide web at <http://edhs1.gsfc.nasa.gov>.

Any questions should be addressed to:

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# Abstract

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This document outlines “as-built” database design and database schema of the Data Distribution database including the physical layout of the database and initial installation parameters.

**Keywords:** data, database, design, configuration, database installation, scripts, security, data model, data dictionary, replication, performance tuning, SQL server, database security, replication, database scripts

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## Abbreviations and Acronyms

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# 1. Introduction

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## 1.1. Identification

This Data Distribution (DDIST) Database Design and Database Schema Specification document, Contract Data Requirement List (CDRL) Item Number 050, whose requirements are specified in Data Item description (DID\_ 311/DV1, is a required deliverable under the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS), Contract NAS5-60000.

## 1.2. Scope

The DDIST Database Design and Database Schema Specification document describes the data design and database specifications to support the data requirements of Release 2 Drop 3 DDIST software.

## 1.3. Purpose

The purpose of the DDIST Database Design and Database Schema Specification document is to support the maintenance of DDIST data and databases throughout the life cycle of ECS. This document communicates the database implementation in sufficient detail to support ongoing configuration management.

## 1.4. Audience

This document is intended to be used by ECS maintenance and operations staff. The document is organized as follows:

- Section 1 provides information regarding the identification, purpose, scope and audience of this document.
- Section 2 provides a listing of the related documents, which were used as a source of information for this document.
- Section 3 provides a mapping data bases to hardware components.
- Section 4 contains the DDIST physical data model which is the database tables, triggers, stored procedures, and flat files.
- Section 5. provides a description of database performance and tuning features such as indexes, caches, and data segments.
- Section 6 provides a description of the security infrastructure used and list of the users, groups, and permissions available upon initial installation.
- Section 7 contains replication design and implementation details.
- Section 8 provides a description of database and database related scripts used for installation, de-installation, backup/recovery, and other miscellaneous functions.

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## 2. Related Documents

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### 2.1. Applicable Documents

The following documents, including Internet links, are referenced in the INGEST Database Design and Database Schema Specification, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this volume. Internet links cannot be guaranteed for accuracy or currency.

|              |  |
|--------------|--|
| 305          | Design Specification for the ECS Project   |
| 920-TDG-009  | GSEC Release B0 DAAC Database Information  |
| 920-TDN- 009 | NSIDC Release B0 DAAC Database Information |
| 920-TDE-009  | EDC Release B0 DAAC Database Information   |
| 920-TDL-009  | LARC Release B0 DAAC Database Information  |
| 920-TDS-009  | SMC Release B0 DAAC Database Information   |
| 920-TDM-009  | Mini-DAAC Release B0 Database Information  |

### 2.2. Information Documents

The following documents, although not directly applicable, amplify or clarify the information presented in this document. These documents are not binding on this document.

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## 3. Database Configurations

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### 3.1. Server Configurations

The database configuration of the INGEST server varies from DAAC to DAAC based on individualized DAAC requirements and hardware availability. These DAAC-specific database configurations are detailed on the following documents:

|             |   |
|-------------|---|
| 920-TDG-009 | GSFC Release B0 DAAC Database Information       |
| 920-TDN-009 | NSIDC Release B0 DAAC Database Information      |
| 920-TDE-009 | EDC Release B0 DAAC Database Information        |
| 920-TDL-009 | LARC Release B0 DAAC Database Information       |
| 920-TDS-009 | SMC Release B0 DAAC Database Information        |
| 920-TDM-009 | Mini-DAAC Release B0 Database Information       |
| 920-TDG-001 | GSFC Version 2.0 Hardware Diagram               |
| 920-TDN-001 | NSIDC Version 2.0 Hardware Diagram              |
| 920-TDE-001 | EDCC Version 2.0 Hardware Diagram               |
| 920-TDL-001 | LARC Version 2.0 Hardware Diagram               |
| 920-TDS-001 | SMC Version 2.0 Hardware Diagram                |
| 920-TDM-001 | Mini-DAAC Version 2.0 Hardware Diagram          |
| 920-TDG-002 | GSFC Version 2.0 Hardware Software Mapping      |
| 920-TDN-002 | NSIDC Version 2.0 Hardware Software Mapping     |
| 920-TDE-002 | EDC Version 2.0 Hardware Software Mapping       |
| 920-TDL-002 | LARC Version 2.0 Hardware Software Mapping      |
| 920-TDS-002 | SMC Version 2.0 Hardware Software Mapping       |
| 920-TDM-002 | Mini-DAAC Version 2.0 Hardware Software Mapping |

These documents are maintained as part of the ECS baseline and available on the world-wide web at the URL <http://pete.hitc.com/baseline/>.

## **3.2. Storage Device Layouts**

Storage Device layouts, disk partitions, vary from DAAC to DAAC based on the amount of data storage expected to be needed to accommodate a particular DAAC's storage requirements. Disk partitions for the INGEST server at each DAAC is detailed in the following documents:

|             |                                   |
|-------------|-----------------------------------|
| 922-TDG-XXX | Release B0 INGEST Disk Partitions |
| 922-TDN-XXX | Release B0 INGEST Disk Partitions |
| 922-TDE-XXX | Release B0 INGEST Disk Partitions |
| 922-TDL-XXX | Release B0 INGEST Disk Partitions |
| 922-TDS-XXX | Release B0 INGEST Disk Partitions |
| 922-TDM-XXX | Release B0 INGEST Disk Partitions |

# 4. Data Design

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## 4.1. Database Overview

The DDIST database implements the large majority of the persistent data requirements for the DDIST subsystem. The database is designed in such a manner as to satisfy business policy while maintaining data integrity and consistency. Database tables are implemented using the Sybase Relational Database Management system (DBMS) version 11.0.1. All components of the DDIST database are described in the section which follow in sufficient detail to support maintenance needs.

### 4.1.1. Physical Data Model Entity Relationship Diagram

The Entity Relationship Diagram(ERD) presents a schematic depiction of the DDIST physical data model. The ERDs presented here for the DDIST database were produced using the S-Designor Data Architect Computer Aided Software Engineering (CASE) tool. ERDs represent the relationship between entities or database tables. On ERDs, tables are represented by rectangles and relationships are represented as arrow (see Figure 4-1).

#### Sample Table

|            |
|------------|
| Table Name |
| Column 1   |
| Column 2   |

#### Independent Table

|          |
|----------|
| Table A  |
| Column 1 |
| Column 2 |

#### Dependent Table

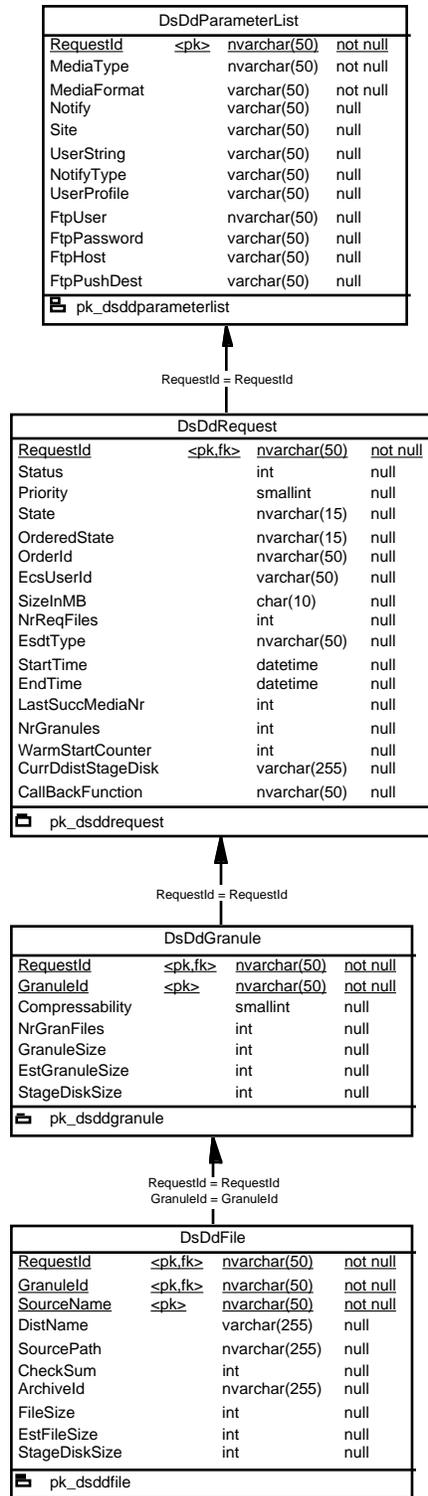
|          |
|----------|
| Table B  |
| Column 1 |
| Column 2 |



*Table A has zero-to-many relationship with Table B*

**Figure 4-1. ERD Key**

The ERDs for the DDIST database are shown in Figures 4-2.



**Figure 4-2. ERDs for the DDIST Database**

#### 4.1.2. Tables

A listing of each the tables in the DDIST database is given here. A brief definition of each of these tables follows including a listing of the columns comprising the table. The Column List indicates if the column is part of the primary key for the table. That is if the columns can be used alone or in combination with other primary key columns to uniquely identify a single row in the table. The column list also indicates whether the column is a mandatory attribute that must be included in every row.

| Table Name        |
|-------------------|
| DsDdFile          |
| DsDdGranule       |
| DsDdParameterList |
| DsDdRequest       |

#### Table: DsDdFile

##### Description

Table holds the distribution files currently being maintained/processed by the EcDsDistributionServer.  
Table Abbreviation is "F" to be used as std naming convention for stored procedures.

##### Column List

| Name          | Code          | Type          | PK  | Mandatory |
|---------------|---------------|---------------|-----|-----------|
| ArchiveId     | ArchiveId     | nvarchar(255) | No  | No        |
| Checksum      | Checksum      | int           | No  | No        |
| DistName      | DistName      | varchar(255)  | No  | No        |
| EstFileSize   | EstFileSize   | int           | No  | No        |
| FileSize      | FileSize      | int           | No  | No        |
| GranuleId     | GranuleId     | nvarchar(50)  | Yes | Yes       |
| RequestId     | RequestId     | nvarchar(50)  | Yes | Yes       |
| SourceName    | SourceName    | nvarchar(50)  | Yes | Yes       |
| SourcePath    | SourcePath    | nvarchar(255) | No  | No        |
| StageDiskSize | StageDiskSize | int           | No  | No        |

## Table: DsDdGranule

### Description

Table holds the distribution granules currently being maintained/processed by the EcDsDistributionServer.

Table Abbreviation is "G" to be used as std naming convention for stored procedures.

### Column List

| Name            | Code            | Type         | PK  | Mandatory |
|-----------------|-----------------|--------------|-----|-----------|
| Compressability | Compressability | int          | No  | No        |
| EstGranuleSize  | EstGranuleSize  | int          | No  | No        |
| GranuleId       | GranuleId       | nvarchar(50) | Yes | Yes       |
| GranuleSize     | GranuleSize     | int          | No  | No        |
| NrGranFiles     | NrGranFiles     | int          | No  | No        |
| RequestId       | RequestId       | nvarchar(50) | Yes | Yes       |
| EsdfType        | EsdfType        | nvarchar(50) | No  | No        |
| StageDiskSize   | StageDiskSize   | int          | No  | No        |

## Table: DsDdParameterList

### Description

Table holds the GLParameter list for each request currently being maintained/processed by the EcDsDistributionServer.

Data is provided from external metadata (MCF) by SDSRV.

Request information is initiated here first.

Table abbreviation is "PL" to be used as std naming convention for stored procedures.

### Column List

| Name        | Code        | Type         | PK  | Mandatory |
|-------------|-------------|--------------|-----|-----------|
| FtpHost     | FtpHost     | varchar(50)  | No  | No        |
| FtpPassword | FtpPassword | varchar(50)  | No  | No        |
| FtpPushDest | FtpPushDest | varchar(50)  | No  | No        |
| FtpUser     | FtpUser     | nvarchar(50) | No  | No        |
| MediaFormat | MediaFormat | varchar(50)  | No  | Yes       |
| MediaType   | MediaType   | nvarchar(50) | No  | Yes       |
| Notify      | Notify      | varchar(50)  | No  | No        |
| NotifyType  | NotifyType  | varchar(50)  | No  | No        |
| RequestId   | RequestId   | nvarchar(50) | Yes | Yes       |
| Site        | Site        | varchar(50)  | No  | No        |
| UserProfile | UserProfile | varchar(50)  | No  | No        |
| UserString  | UserString  | varchar(50)  | No  | No        |

### Table: DsDdRequest

#### Description

Table holds the distribution requests currently being maintained/processed by the EcDsDistributionServer.

Table abbreviation is "R" to be used as std naming convention for stored procedures.

### Column List

| <b>Name</b>        | <b>Code</b>        | <b>Type</b>  | <b>PK</b> | <b>Mandatory</b> |
|--------------------|--------------------|--------------|-----------|------------------|
| CallBackFunction   | CallBackFunction   | nvarchar(50) | No        | No               |
| CurrDdistStageDisk | CurrDdistStageDisk | varchar(255) | No        | No               |
| EcsUserId          | EcsUserId          | varchar(50)  | No        | No               |
| EndTime            | EndTime            | datetime     | No        | No               |
| EsdtType           | EsdtType           | nvarchar(50) | No        | No               |
| LastSuccMediaNr    | LastSuccMediaNr    | int          | No        | No               |
| NrGranules         | NrGranules         | int          | No        | No               |
| NrReqFiles         | NrReqFiles         | int          | No        | No               |
| OrderedState       | OrderedState       | nvarchar(15) | No        | No               |
| OrderId            | OrderId            | nvarchar(50) | No        | No               |
| Priority           | Priority           | smallint     | No        | No               |
| RequestId          | RequestId          | nvarchar(50) | Yes       | Yes              |
| SizeInMB           | SizeInMB           | int          | No        | No               |
| StartTime          | StartTime          | datetime     | No        | No               |
| State              | State              | nvarchar(15) | No        | No               |
| Status             | Status             | int          | No        | No               |
| WarmStartCounter   | WarmStartCounter   | int          | No        | No               |

### **4.1.3. Columns**

Brief definitions of each of the columns present in the database tables defined above are contained herein.

#### **Column: ArchiveId**

##### **Description**

The Archive Id from science data server (SDSRV).

Constraints:

#### **Column: CallbackFunction**

##### **Description**

Callback function that should be called when distribution request are completed.

Constraints:

#### **Column: CheckSum**

##### **Description**

The Archive checksum.

Constraints:

#### **Column: Compressability**

##### **Description**

The compressability of the granule.

Constraints:

#### **Column: CurrDdistStageDisk**

##### **Description**

Current distribution staging disk.

Constraints:

#### **Column: DistName**

##### **Description**

The Distribution file name.

Constraints:

#### **Column: EcsUserId**

##### **Description**

The User ID of the user initiating request.

Constraints:

### **Column: EndTime**

#### **Description**

The time of the distribution ended.

Constraints:

### **Column: EsdtType**

#### **Description**

The ESDT (Earth Science Data Type) Type. A Request is of one ESDT Type and can include many Granules, but all Granules associated with a Request must be of the same ESDT Type.

Constraints:

### **Column: EstFileSize**

#### **Description**

The estimated size of the file.

Constraints:

### **Column: EstGranuleSize**

#### **Description**

The sum of the estimated size of the files in the granule.

Constraints:

### **Column: FileSize**

#### **Description**

The size of the file.

Constraints:

### **Column: FtpHost**

#### **Description**

Holds the hostname to connect to for FTP push.

Constraints:

### **Column: FtpPassword**

**Description**

Holds the password to use for FTP push.

Constraints:

**Column: FtpPushDest****Description**

Holds the target system directory.

Constraints:

**Column: FtpUser****Description**

Holds the login to use for the FTP push.

Constraints:

**Column: GranuleId****Description**

The Granule Id of the granule.

Constraints:

**Column: GranuleSize****Description**

The sum of the sizes of files in the granule.

Constraints:

**Column: LastSuccMediaNr****Description**

The last successful media number.

**Column: MediaFormat****Description**

The media distribution format (i.e. FILEFORMAT, TARFORMAT...)

Constraints:

**Column: MediaType****Description**

The type of media used for a request (i.e. 8MM TAPE, CDROM)

Constraints:

### **Column: Notify**

#### **Description**

Indicates the mail address to use for notification.

Constraints:

### **Column: NotifyType**

#### **Description**

If MAIL is specified, a Distribution Notification message will be sent, either to email address of logical queue specified in the NOTIFY parameter. If LIST is specified, a Gparameter list of distributive files will be returned to the RPC caller.

Constraints:

### **Column: NrGranFiles**

#### **Description**

The number of files in a granule.

Constraints:

### **Column: NrGranules**

#### **Description**

The number of granules per media object.

Constraints:

### **Column: NrReqFiles**

#### **Description**

The number of files in the distribution request.

Constraints:

### **Column: OrderedState**

#### **Description**

The ordered state of a request. (i.e. Cancel, Suspend, Marked Shipped,..)

Constraints:

### **Column: OrderId**

**Description**

The OrderId for the distribution request.

Constraints:

**Column: Priority****Description**

The priority for the DistRequest object.

Constraints:

**Column: RequestId****Description**

The RequestID of the distribution request that come from science data server (SDSRV).

Constraints:

**Column: Site****Description**

Site to be notified.

Constraints:

**Column: SizeInMB****Description**

The total size of bytes in the distribution request.

Constraints:

**Column: SourceName****Description**

Input file name from science data server (SDSRV).

Constraints:

**Column: SourcePath****Description**

The Staging file path.

Constraints:

**Column: StageDiskSize**

**Description**

The size of the staging disk required to hold the file.

Constraints:

**Column: StartTime****Description**

The start time of the distribution request.

Constraints: \

**Column: State****Description**

The queue state of the distribution request. (i.e. Pending, Active, Shipped,..)

Constraints:

**Column: Status****Description**

The status for the DistRequest object.

Constraints:

**Column: UserProfile****Description**

Holds the profile ID.

Constraints:

**Column: UserString****Description**

Free text string supplied by the user. Returned in the Distribution Email message as "UserString: <supplied string>"

Constraints:

**Column: WarmStartCounter****Description**

The warm start counter.

note: This attribute is used for recovery.

Constraints:

#### 4.1.4. Column Domains

Domains specify the ranges of values allowed for a given table column. Sybase supports the definition of specific domains to further limit the domain inherent in a given data type. The domains defined in the DDIST database are given here as well as an indication of the columns to which they apply.

##### Domain: archiveid

###### Reference List

| Table Code | Column Name | Column Code | Label |
|------------|-------------|-------------|-------|
| DsDdFile   | ArchiveId   | ArchiveId   |       |

##### Domain: callback

###### Reference List

| Table Code  | Column Name      | Column Code      | Label |
|-------------|------------------|------------------|-------|
| DsDdRequest | CallBackFunction | CallBackFunction |       |

##### Domain: checksum

###### Reference List

| Table Code | Column Name | Column Code | Label |
|------------|-------------|-------------|-------|
| DsDdFile   | Checksum    | Checksum    |       |

##### Domain: esdttype

**Reference List**

| Table Code  | Column Name | Column Code | Label |
|-------------|-------------|-------------|-------|
| DsDdRequest | EsdtType    | EsdtType    |       |

**Domain: file****Reference List**

| Table Code | Column Name | Column Code | Label |
|------------|-------------|-------------|-------|
| DsDdFile   | SourceName  | SourceName  |       |

**Domain: granuleid****Reference List**

| Table Code  | Column Name | Column Code | Label |
|-------------|-------------|-------------|-------|
| DsDdFile    | GranuleId   | GranuleId   |       |
| DsDdGranule | GranuleId   | GranuleId   |       |

**Domain: itemcount****Reference List**

| Table Code  | Column Name      | Column Code      | Label |
|-------------|------------------|------------------|-------|
| DsDdGranule | NrGranFiles      | NrGranFiles      |       |
| DsDdRequest | NrGranules       | NrGranules       |       |
| DsDdRequest | NrReqFiles       | NrReqFiles       |       |
| DsDdRequest | WarmStartCounter | WarmStartCounter |       |

**Domain: mediatype**

**Reference List**

| Table Code        | Column Name | Column Code | Label |
|-------------------|-------------|-------------|-------|
| DsDdParameterList | MediaType   | MediaType   |       |

**Domain: orderid**

**Reference List**

| Table Code  | Column Name | Column Code | Label |
|-------------|-------------|-------------|-------|
| DsDdRequest | OrderId     | OrderId     |       |

**Domain: path**

**Reference List**

| Table Code | Column Name | Column Code | Label |
|------------|-------------|-------------|-------|
| DsDdFile   | SourcePath  | SourcePath  |       |

**Domain: priority**

**Reference List**

| Table Code  | Column Name | Column Code | Label |
|-------------|-------------|-------------|-------|
| DsDdRequest | Priority    | Priority    |       |

**Domain: requestid**

**Reference List**

| <b>Table Code</b> | <b>Column Name</b> | <b>Column Code</b> | <b>Label</b> |
|-------------------|--------------------|--------------------|--------------|
| DsDdFile          | RequestId          | RequestId          |              |
| DsDdGranule       | RequestId          | RequestId          |              |
| DsDdParameterList | RequestId          | RequestId          |              |
| DsDdRequest       | RequestId          | RequestId          |              |

**Domain: size**

**Reference List**

| <b>Table Code</b> | <b>Column Name</b> | <b>Column Code</b> | <b>Label</b> |
|-------------------|--------------------|--------------------|--------------|
| DsDdGranule       | Compressability    | Commpressability   |              |
| DsDdRequest       | SizeInMB           | SizeInMB           |              |
| DsDdFile          | EstFileSize        | EstFileSize        |              |
| DsDdGranule       | EstGranuleSize     | EstGranuleSize     |              |
| DsDdFile          | FileSize           | FileSize           |              |
| DsDdGranule       | GranuleSize        | GranuleSize        |              |
| DsDdFile          | StageDiskSize      | StageDiskSize      |              |
| DsDdGranule       | StageDiskSize      | StageDiskSize      |              |

**Domain: state**

**Reference List**

| <b>Table Code</b> | <b>Column Name</b> | <b>Column Code</b> | <b>Label</b> |
|-------------------|--------------------|--------------------|--------------|
| DsDdRequest       | OrderedState       | OrderedState       |              |
| DsDdRequest       | State              | State              |              |

**Domain: status**

**Reference List**

| <b>Table Code</b> | <b>Column Name</b> | <b>Column Code</b> | <b>Label</b> |
|-------------------|--------------------|--------------------|--------------|
| DsDdRequest       | Status             | Status             |              |

**Domain: username**

**Reference List**

| <b>Table Code</b> | <b>Column Name</b> | <b>Column Code</b> | <b>Label</b> |
|-------------------|--------------------|--------------------|--------------|
| DsDdParameterList | FtpUser            | FtpUser            |              |

#### **4.1.5. Rules**

Sybase supports the definitions of rules. Rules provide a means for enforcing domain constraints on a given column. There are no rules defined in Sybase for the DDIST database.

#### **4.1.6. Defaults**

Defaults are used to supply a value for a column when one is not defined at insert time. There are no defaults defined in Sybase in the DDIST database.

#### **4.1.7. Views**

Sybase allows the definition of views as a means of limiting an application or users access to data in a table or tables. Views create a logical table from columns found in one or more tables. There are no views defined in the DDIST database.

#### **4.1.8. Integrity Constraints**

Sybase version 11.0.1 allows the enforcement of referential integrity via the use of declarative integrity constraints. Integrity constraints allow the SQL server to enforce primary and foreign key integrity checks without automatically without requiring programming. Sybase 11 is only ANSI-92 compliant, however, therefore its constraints support “restrict-only” operations. This means that a row can not be deleted or updated if there are rows in other tables having a foreign key dependency on that row. Cascade delete and update operations can not be performed if a declarative constraint has been used. All declarative integrity constraints defined in the DDIST database are described herein.

### Dependencies on Table: DsDdFile

### Dependencies on Table: DsDdGranule

#### Reference by List

| Referenced by | Primary Key            | Foreign Key            |
|---------------|------------------------|------------------------|
| DsDdFile      | RequestId<br>GranuleId | RequestId<br>GranuleId |

### Dependencies on Table: DsDdParameterList

#### Reference by List

| Referenced by | Primary Key | Foreign Key |
|---------------|-------------|-------------|
| DsDdRequest   | RequestId   | RequestId   |

### Dependencies on Table: DsDdRequest

#### Reference by List

| Referenced by | Primary Key | Foreign Key |
|---------------|-------------|-------------|
| DsDdGranule   | RequestId   | RequestId   |

### 4.1.9. Triggers

Sybase supports the enforcement of business policy via the use of triggers. A trigger is best defined as set of activities or checks that should be performed automatically when ever a row is inserted, updated, or deleted from a given table. Sybase version 11.0.1 allows the definition of insert, update, and delete trigger per table. A listing of each the triggers in the DDIST database is given here. A brief definition of each of these triggers follows.

#### Trigger List

| Table             | Trigger          | Description           |
|-------------------|------------------|-----------------------|
| DsDdParameterList | DsDdPLDeleteTrig | Referential Integrity |
| DsDdRequest       | DsDdRDeleteTrig  | Referential Integrity |
| DsDdFile          | DsDdFDeleteTrig  | Referential Integrity |
| DsDdGranule       | DsDdGDeleteTrig  | Referential Integrity |

Triggers' script files are under directory /ecs/formal/DSS/distribution/src/Database as \*Trig.sql. Their descriptions are included in the leading comments of each Trigger's script file.

### 4.1.10. Stored Procedures

Sybase also includes support for business policy via the use of stored procedures. Stored procedures are typically used to capture a set of activities or checks that will be performed on the database repeatedly to enforce business policy and maintain data integrity. Stored procedures are parsed and compiled SQL code that reside in the database and may be called by name by an application, trigger or another stored procedure There are no stored procedures in the DDIST database.

Stored Procedures' script files are under directory /ecs/formal/DSS/distribution/src/Database as \*.sp. Their descriptions are included in the leading comments of each Procedure's script file.

## 4.2. File Usage

There are cases when the implementation of a persistent data requirement is better suited to a flat file than to a database table. A typical example of such data is system configuration information. System configuration information is fairly static and usually has no explicit relationship to other data in the enterprise. Another common use of files in ECS is as an interface mechanism between ECS and the external world. FIILSUB file usage is detailed in this section via file definitions, attribute definitions, and attribute domain definitions.

### 4.2.1. Files Definitions

A listing of each the files in the DDIST database is given here. A brief definition of each of these files follows.

#### **4.2.2. Attributes**

Brief definitions of each of the attributes present in the files defined above are contained herein.

#### **4.2.3. Attribute Domains**

Domains represent the ranges of valid values allowed for a given file attribute. Attributes domains for each of the attributes defined above are given here.

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## 5. Performance and Tuning Factors

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### 5.1. Indexes

An index provides a means of locating a row in a table based on the value of specific columns, without having to scan each row in the table. If used appropriately, indexes can significantly increase data retrieval. Sybase allows the definition of two types of indexes, clustered and non-clustered. In a clustered index, the rows in a table are physically stored in the sort order determined by the index. Clustered indexes are particularly useful, when the data is frequently retrieved in order. Non-clustered indexes differ from their clustered counterpart, in that data is not physically stored in sort order. Only one clustered index may be defined per table. A list of all the indexes defined against tables in the DDIST database is given here along with a description of each index.

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### 5.2. Segments

Sybase supports the definition of segments. A segment is a named pointer to a storage device or devices. Segments are used to manually place database objects onto particular storage devices. All segments explicitly defined in the DDIST database are described herein.

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### 5.3. Named Caches

A cache is a block of memory that is used by Sybase to house data pages that are currently being accessed. A named cache is a named block of memory that the SQL server can use to house frequently accessed tables. Assigning a table to cache causes it to be loaded into memory. This greatly increases performance by eliminating the time expense normally associated with disk i/o. Named caches used in the DDIST databases are described herein.

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## 6. Database Security

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### 6.1. Initial Users

Upon initial installation the following users will have access to DDIST database. The level of access is limited to that associated with their assigned group and/or role. A complete definition of each of these groups and roles is given below.

### 6.2. Groups

Groups are a means of logically associating users with similar data access needs. Once a group has been defined, object and command permissions can be granted to that group. A user who is member of a group inherits all of the permissions granted to that group. Several groups have been defined in the DDIST database upon initial installation. A definition of each of these groups is contained herein.

### 6.3. Roles

Roles were introduced in Sybase 10 to allow a structured means for granting users the permissions needed to perform standard database administration activities and also provide a means for easily identifying such users. There are six pre-defined roles that may be assigned to a user. A definition of each of these roles follows as well as a description of the types of activities that may be performed by each role.

**System Administrator** (sa\_role) - This role is used to grant a specific user the permissions needed to perform standard system administrator duties including:

- installing SQL server and specific SQL server modules
- managing the allocation of physical storage
- tuning configuration parameters
- creating databases

**Site Security Officer** (sso\_role) - This role is used to grant a specific user the permissions needed to maintain SQL server security including:

- adding server logins
- administering passwords
- managing the audit system
- granting users all roles except sa\_role

**Operator** (oper\_role) - This role is used to grant a specific user the permissions needed to manage backup and recovery of the database including;

- dumping transactions and databases
- loading transactions and databases

**Navigator** (navigator\_role) -This role is used to grant a specific user the permissions needed to manage the navigation server.

**Replication** (replication\_role) - - This role is used to grant a specific user the permissions needed to manage the replication server.

**Sybase Technical Support** (sybase\_ts\_role) - This role is used to grant a specific user the permissions needed to perform database consistency checker (dbcc), a sybase supplied utility, commands that are considered outside of the realm of normal system administrator activities.

## 6.4. Object Permissions

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# 7. Replication

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## 7.1. Replication Overview

Replication as the name implies is a set of Sybase products that allow replication of data from one database to another. In order for replication to be accomplished the data source must define the tables and columns that may be replicated to a data recipient. These definitions are referred to as replication definitions. In the same manner a data recipient must specify the replication definitions in which he is interested. These specifications are referred to as replication subscriptions. In addition the replication database and server must be configured to support the potentially large volumes of data that will be transferred between the source and recipient databases. DDIST does not require nor utilize replication to meet its intended requirements.

## 7.2. Replication Definitions

Not Applicable.

## 7.3. Replication Subscriptions

Not Applicable.

## 7.4. Replication Database Configuration

Not Applicable.

## 7.5. Replication Server Configuration

Not Applicable.

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## 8. Scripts

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### 8.1. Installation Scripts

Any scripts used to support installation of the DDIST database are described herein.

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### 8.2. De-Installation Scripts

Any scripts used to support de-installation of the DDIST database are described herein.

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### 8.3. Backup/Recovery Scripts

Any scripts used to facilitate backup or recovery of the DDIST database are described herein.

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### 8.4. Miscellaneous Scripts

Miscellaneous scripts applicable to the DDIST database are described herein.

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# Abbreviations and Acronyms

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|        |  |
|--------|--|
| ACL    | Access Control List  |
| ACMHW  | Access and Control Management HWCI   |
| ADC    | affiliated data center   |
| ADSHW  | Advertising Server HWCI  |
| ADSRV  | Advertising Service CSCI   |
| AI&T   | algorithm integration and test   |
| AITHW  | Algorithm Integration and Test HWCI  |
| AITTL  | Algorithm Integration and Test CSCI  |
| AM-1   | EOS AM Project spacecraft 1, morning spacecraft series -- ASTER, CERES, MISR, MODIS and MOPITT instruments |
| ANSI   | American National Standards Institute  |
| API    | application program (or programming) interface   |
| APID   | application's process ID   |
| AQAHW  | Algorithm QA HWCI  |
| ASCII  | American Standard Code for Information Exchange  |
| ASTER  | Advanced Spaceborne Thermal Emission and Reflection Radiometer (formerly ITIR)                             |
| AVHRR  | Advanced Very High-Resolution Radiometer   |
| BER    | bit error rate   |
| BUFR   | binary universal format for representation of data   |
| CASE   | Computer Aided Software Engineering  |
| CCSDS  | Consultative Committee for Space Data Systems  |
| CD     | contractual delivery 214-001   |
| CD-ROM | compact disk -- read only memory   |
| CDR    | Critical Design Review   |
| CDRL   | contract data requirements list  |
| CERES  | Clouds and Earth's Radiant Energy System   |

|       |   |
|-------|---|
| CI    | configuration item                                  |
| COTS  | commercial off-the-shelf (hardware or software)     |
| CPU   | central processing unit                             |
| CSCI  | computer software configuration item                |
| CSDT  | Computer Science Data Type                          |
| CSMS  | Communications and Systems Management Segment (ECS) |
| CSS   | Communications Subsystem                            |
| DAAC  | Distributed Active Archive Center                   |
| DAN   | data availability notice                            |
| DAO   | Data Assimilation Office                            |
| DAR   | data acquisition request                            |
| DAS   | data availability schedule                          |
| DBMS  | Database Management System                          |
| DDICT | Data Dictionary CSCI                                |
| DDIST | Data Distribution Services CSCI                     |
| DDSRV | Document Data Server CSCI                           |
| DESKT | Desktop CSCI  |
| DID   | data item description                               |
| DIM   | distributed information manager (SDPS)              |
| DIMGR | Distributed Information Manager CSCI                |
| DIPHW | Distribution and Ingest Peripheral Management HWCI  |
| DMGHW | Data Management HWCI                                |
| DMS   | Data Management Subsystem                           |
| DMWG  | Data Management Working Group                       |
| DP    | Data Provider                                       |
| DPR   | data processing request                             |
| DPREP | Science Data Preprocessing CSCI                     |
| DPS   | Data Processing Subsystem                           |
| DRPHW | Data Repository HWCI                                |
| DSS   | Data Server Subsystem                               |

|          |   |
|----------|---|
| ECS      | EOSDIS Core System  |
| EDC      | EROS Data Center  |
| EDHS     | ECS Data Handling System  |
| EDOS     | EOS Data and Operations System  |
| EOS      | Earth Observing System  |
| EOS-AM   | EOS Morning Crossing (Descending) Mission -- see AM-1   |
| EOSDIS   | Earth Observing System Data and Information System  |
| EROS     | Earth Resources Observation System  |
| ESDIS    | Earth Science Data and Information System (GSFC)  |
| ESDT     | Earth science data types  |
| ESN      | EOSDIS Science Network (ECS)  |
| FDDI     | fiber distributed data interface  |
| FDF      | flight dynamics facility  |
| FDFEPHEM | FDF-generated definitive orbit data   |
| FGDC     | Federal Geographic Data Commuittee  |
| FK       | Foreign Key   |
| FOO      | Flight of Opportunity   |
| FOS      | Flight Operations Segment (ECS)   |
| GB       | gigabyte ( $10^9$ )   |
| GNU      | (recursive acronym: “GNU’s Not Unix”); a project supported by the Free Software Foundation dedicated to the delivery of free software |
| GPCP     | Global Precipitation Climatology Project  |
| GPCP     | Global Precipitation Climatology Project  |
| GPI      | GOES Precipitation Index  |
| GRIB     | GRid In Binary  |
| GSFC     | Goddard Space Flight Center   |
| GTWAY    | Version 0 Interoperability Gateway CSCI   |
| GUI      | graphic user interface  |
| GV       | ground validation   |
| HDF      | hierarchical data format  |

|         |  |
|---------|--|
| HDF-EOS | an EOS proposed standard for a specialized HDF data format |
| HIPPI   | high performance parallel interface                        |
| HMI     | human machine interface                                    |
| HTML    | HyperText Markup Language                                  |
| HTTP    | Hypertext Transport Protocol                               |
| HWCI    | hardware configuration item                                |
| I&T     | integration and test                                       |
| I/F     | interface  |
| I/O     | input/output   |
| ICD     | interface control document                                 |
| ICLHW   | Ingest Client HWCI   |
| ID      | identification   |
| IDE     | Interactive Development Environments                       |
| IDG     | Infrastructure Development Group                           |
| IDR     | Incremental Design Review                                  |
| IERS    | International Earth Rotation Service                       |
| IMS     | Information Management System (obsolete ECS element name)  |
| INGST   | Ingest Services CSCI                                       |
| IOS     | Interoperability Subsystem                                 |
| IP      | international partners                                     |
| IR-1    | Interim Release 1  |
| IRD     | interface requirements document                            |
| ISO     | International Standards Organization                       |
| ISS     | Internetworking Subsystem                                  |
| IV&V    | independent verification and validation                    |
| JPL     | Jet Propulsion Laboratory                                  |
| L0-L4   | Level 0 (zero) through Level 4                             |
| LaRC    | Langley Research Center (DAAC)                             |
| LIM     | local information manager (SDPS)                           |

|        |  |
|--------|--|
| LIMGR  | Local Information Manager CSCI                                     |
| LIS    | Lightning Imaging Sensor   |
| LSM    | local system management (ECS)                                      |
| MB     | megabyte ( $10^6$ )  |
| MDT    | mean downtime  |
| MDT    | mean downtime  |
| MFLOPS | mega (millions of) floating-point operations ( $10^6$ ) per second |
| MISR   | Multi-Angle Imaging SpectroRadiometer                              |
| MODIS  | Moderate-Resolution Imaging Spectrometer                           |
| MOPITT | Measurements of Pollution in the Troposphere                       |
| MSFC   | Marshall Space Flight Center                                       |
| MSS    | Management Support Subsystem                                       |
| MTBF   | mean time between failure  |
| MTPE   | Mission to Planet Earth  |
| MTTR   | mean time to restore   |
| N/A    | not applicable   |
| NAS    | National Academy of Science  |
| NASA   | National Aeronautics and Space Administration                      |
| NESDIS | National Environmental Satellite Data and Information Service      |
| NMC    | National Meteorological Center (NOAA)                              |
| NOAA   | National Oceanic and Atmospheric Administration                    |
| NSIDC  | National Snow and Ice Data Center (DAAC)                           |
| O/A    | orbit/altitude   |
| ODC    | other data center  |
| OSI    | Open System Interconnect   |
| PDPS   | Planning and Data Processing Subsystem                             |
| PDR    | Preliminary Design Review  |
| PDS    | production data set  |
| PGE    | Product Generation Executive                                       |

|            |   |
|------------|---|
| PGS        | Product Generation System (obsolete ECS element name) (ASTER) |
| PK         | Primary Key   |
| PLANG      | Production Planning CSCI                                      |
| PLNHW      | Planning HWCI   |
| PLS        | Planning Subsystem  |
| POSIX      | Portable Operating System Interface for Computer Environments |
| PR         | Precipitation Radar (TRMM)                                    |
| PRONG      | Processing CSCI   |
| QA         | quality assurance   |
| RMA        | reliability, maintainability, availability                    |
| RTF        | rich text format  |
| SAA        | satellite active archive                                      |
| SAGE       | Stratospheric Aerosol and Gas Experiment                      |
| SCF        | Science Computing Facility                                    |
| SDP        | Science Data Processing                                       |
| SDPF       | Sensor Data Processing Facility (GSFC)                        |
| SDPS       | Science Data Processing Segment (ECS)                         |
| SDPTK      | SDP Toolkit CSCI  |
| SDSRV      | Science Data Server CSCI                                      |
| SeaWIFS II | Sea-Viewing Wide Field-of-View Sensor II                      |
| SFDU       | Standard Format Data Unit                                     |
| SMC        | System Management Center (ECS)                                |
| SPRHW      | Science Processing HWCI                                       |
| SRS        | software requirements specification                           |
| SSM/I      | Special Sensor for Microwave/Imaging (DMSP)                   |
| SST        | sea surface temperature                                       |
| STMGMT     | Storage Management  |
| STMGT      | Storage Management Software CSCI                              |
| SUBSRV     | Subscription Server   |

|       |  |
|-------|--|
| TMI   | TRMM Microwave Image                                 |
| TOMS  | Total Ozone Mapping Spectrometer                     |
| TONS  | TDRS On-board Navigational System                    |
| TRMM  | Tropical Rainfall Measuring Mission (joint US-Japan) |
| TSDIS | TRMM Science Data and Information System             |
| USNO  | US Naval Observatory                                 |
| UT    | universal time                                       |
| UTC   | universal time code                                  |
| V0    | Version 0  |
| VIRS  | Visible Infrared Scanner (TRMM)                      |
| WAIS  | Wide Area Information Server                         |
| WKBCH | Workbench CSCI                                       |
| WKSHW | Working Storage HWCI                                 |
| WWW   | World-Wide Web                                       |

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